

IN THE CLAIMS

This listing of claims replaces all previous listings and versions of the claims in this application.

1. (Previously amended) A nonvolatile semiconductor memory device comprising:

- a substrate;
- a plurality of sectors on the substrate;
- each sector comprising memory cell transistors arranged in a cell array block and decoder transistors in a column decoder block;
- wherein the transistors in the cell array block and column decoder block in each sector share a common bulk region, wherein the common bulk region is formed on the substrate and is connected to a bulk driver provided in each of the sectors, each said bulk driver configured to commonly apply a bulk voltage to the common bulk region of the sector; and
- wherein said semiconductor memory device is configured to electrically erase all the memory cell transistors in a sector together.

2. (Original) A nonvolatile semiconductor memory device according to claim 1, wherein the semiconductor memory device is a NOR-type memory device.

3. (Original) A nonvolatile semiconductor memory device according to claim 1, further comprising a write driver and a sense amplifier.

4. (Original) A nonvolatile semiconductor memory device according to claim 3, wherein the write driver and sense amplifier are configured to be placed in a state of high impedance during an erase operation to avoid influencing circuit operation during the erase operation.

5. (Original) A sector structure of a nonvolatile semiconductor memory, said sector structure comprising:

- a plurality of memory cell transistors arranged in a cell array block; and
- ~~a plurality of decoder transistors arranged in a column decoder block,~~ wherein said memory cell transistors and decoder transistors are arranged on a common bulk region.

6. (Original) A sector structure of a nonvolatile semiconductor memory according to claim 5, wherein an erase operation is configured to erase all of the transistors in the sector simultaneously.

7. (Original) A sector structure of a nonvolatile semiconductor memory according to claim 5, said sector structure further comprising:

a plurality of word lines arranged in the cell array block, each word line being connected to a plurality of cell gates;

a plurality of bit lines arranged in the cell array block, each bit line being connected to a plurality of memory cell drains;

a plurality of common data lines connected to the bit lines;

a plurality of write drivers, each connected to a respective one of the common data lines; and

a plurality of sense amplifiers, each connected to a respective one of the common data lines.

8. (Original) A sector structure of a nonvolatile semiconductor memory according to claim 7, wherein each write driver and sense amplifier is configured to be placed in a state of high impedance during an erase operation.

9. (Original) A sector structure of a nonvolatile semiconductor memory according to claim 5, wherein said sector structure is configured to provide 64 Kbytes of memory.

10. (Currently Amended) A nonvolatile semiconductor memory device with a plurality of sectors, each sector comprising:

a cell array block comprising a plurality of word lines, a plurality of bit lines, and a plurality of memory cell transistors having gates and drains, each gate being connected to a corresponding word line out of a the plurality of word lines, each drain being connected to a corresponding bit line out of a the plurality of bit lines;

a source line driver commonly connected to a source of each of the plurality of memory cell transistors and configured to apply a source voltage;

a column decoder block comprising a plurality of column decoder transistors, each column decoder transistor connected ~~between one~~ a corresponding bit line out of the plurality

of bit lines and a common data line configured to select one bit line out of the plurality of bit lines; and

9/ a common bulk region arranged in each sector and formed immediately adjacent to a substrate region, wherein the plurality of memory cell transistors and the plurality of column decoder transistors in each sector share the common bulk region; and

a bulk driver provided in each of the sectors, each said bulk driver configured to commonly apply a bulk voltage to the common bulk region of that sector.

11. (Original) A nonvolatile semiconductor memory device according to claim 10, wherein the memory device is a NOR-type flash EEPROM.

12. (Original) A nonvolatile semiconductor memory device according to claim 10, wherein the bulk region is a pocket P-well.

13. (Original) A nonvolatile semiconductor memory device according to claim 10, further comprising a plurality of write drivers and sense amplifiers, wherein each data line is connected to a corresponding one of the write drivers and a corresponding one of the sense amplifiers.

14. (Original) A nonvolatile semiconductor memory device according to claim 13, wherein the write drivers and sense amplifiers are each configured to be placed in a state of high impedance during an erase operation.

15. (Previously amended) A nonvolatile semiconductor memory device comprising:

a substrate; a plurality of sector units, each sector unit comprising a common bulk region, the bulk region being formed on the substrate and connected to a bulk driver, and wherein each sector unit is configured to be electrically erasable in response to an erase signal; and a plurality of memory cell transistors and transistors of a column decoder arranged in the common bulk region of each sector unit and configured to commonly receive a bulk voltage.

16. (Original) A nonvolatile semiconductor memory device according to claim 15, wherein each sector unit further comprises a bulk driver configured to supply a bulk voltage to the common bulk region.

17. (Original) A nonvolatile semiconductor memory device according to claim 15, wherein said plurality of memory cell transistors are arranged in a cell array block, wherein said plurality of column decoder transistors are arranged in a column decoder block, and wherein said cell array block and said column decoder block are both arranged on the common bulk region.

18. (Previously amended) A method of forming a bulk region of a nonvolatile semiconductor device, said method comprising:

forming a bulk region for memory cell transistors provided in a cell array block of the nonvolatile semiconductor memory device, wherein the cell array block is arranged in an (M x N) array with M and N both at least equal to two; and

forming a bulk region for decoder transistors of a column decoder in the bulk region for the memory cell transistors of the cell array block, wherein the column decoder is arranged in a (P x N) array with P at least equal to one.

19. (Original) A method of forming a bulk region of a nonvolatile semiconductor device, according to claim 18, further comprising configuring the bulk regions for the memory cell transistors and decoder transistors to receive a common bulk signal during an erase operation.

20. (Original) A method of forming a bulk region of a nonvolatile semiconductor device, according to claim 18, wherein said memory cell transistors and said decoder transistors are configured to be simultaneously erased with each other during an erase operation.

21-25. (Previously Withdrawn)

26. (Previously added) The device of claim 1, wherein the cell array block and the column decoder block of each sector share a plurality of word lines and a plurality of bit lines.

27. (Previously added) The device of claim 17, wherein the cell array block is arranged in a ($M \times N$) array and the column decoder block is arranged in a ($P \times N$) array, where M and N are at least equal to two and P is at least equal to one.